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(12) # EUROPEAN PATENT APPLICATION

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(54) **Star conveyor wheel for the transfer of cylindrical containers into and out of a pressure vessel housing equipment by which the containers are vacuum sealed.**

(57) The star wheel (1) disclosed is intended for use in conjunction with equipment by which cans (2) are sealed in a vacuum, and consists substantially in a hollow cylindrical body (6) provided with a set of radially-disposed recesses (7), each of which served by an ejector that is made to slide radially across the recess by a stationary cam fixed to the frame of the sealing equipment.

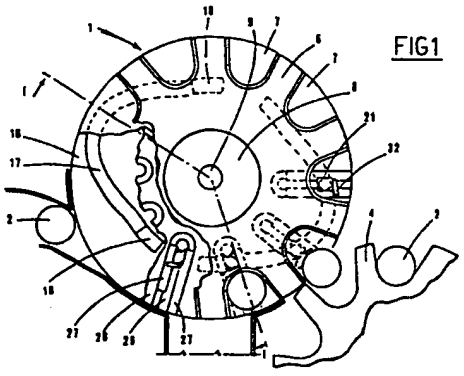

FIG1

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Bundesdruckerei Berlin

Description

The invention relates to a star conveyor wheel for the transfer of cylindrical containers into and out of a pressure vessel housing equipment by which the containers are vacuum sealed.

The prior art in this field embraces systems for sealing cylindrical containers (cans), wherein the sealed material may be tin, aluminium or plastic. The filled can is sealed by seam-folding one of its two bases (in effect, the lid) to the lip of the cylindrical container, using seam-folding machinery of the conventional type.

Where the filled cans are to be sealed in a vacuum, the seam-folding machine is located internally of a large vessel embodied in such a way as to create an airtight chamber, inside which negative pressure is maintained.

Containers are conveyed into and out of the vacuum chamber by a star wheel provided with a plurality of recesses, each one of which fully accommodates one container.

The star wheel is rotatable about its own vertical axis, and slides to an exact fit in a slot which passes through one of the vessel walls; the cross section of the slot and the axial section of the star wheel are identical, and the depth of the slot is greater than the diameter of a single recess of the star wheel.

The embodiment of the star wheel must be such as to ensure transfer of the container at high speed onto a further conveyor, once inside the pressure vessel. Whatever the design of internal conveyor employed, e.g. a belt, or another star wheel, transfer of the container from one to the other must occur at high speed both when entering and when leaving the vacuum chamber.

It has been found that conventional types of star wheel cannot guarantee smooth passage from the one conveyor to the other at high production tempos. Accordingly, the object of the invention is that of guaranteeing smooth transfer of containers from one star conveyor wheel to another at high speed while maintaining an efficient airtight seal and ensuring that there is no loss of negative pressure from the vessel housing the seam-folding unit.

The stated object and others besides are realized with a star wheel as disclosed herein, which serves to transfer cylindrical containers into and out of a pressure vessel housing equipment for vacuum sealing of such containers.

The star conveyor wheel according to the invention consists substantially in a hollow cylindrical body exhibiting a plurality of radially disposed recesses that open out onto its cylindrical wall and serve to accommodate single containers, and is characterized in that it comprises a plurality of ejection means, each of which slidable through the radial direction across a respective recess between a position of total concealment within the hollow body of the wheel, whereby the recess is left completely vacant, and an extended position located at the farthest outer extremity of the recess; and cam control means by which the ejection means are operated both during entry and during exit of containers into and from the pressure vessel.

The invention will now be described in detail, by way of example, with the aid of the accompanying drawings, in which:

fig 1 is a plan of the star conveyor wheel disclosed in which certain parts are cut away better to reveal others;

fig 2 is the section through I-I in fig 1;

fig 3 illustrates a detail of the star wheel viewed from the same standpoint as that of fig 2, during ejection of a container;

fig 4 illustrates a detail of the cam control means, viewed in plan;

fig 5 is a section through part of the cam control means illustrated in fig 4.

Referring to figs 1 and 2 of the drawings, 1 denotes a star conveyor wheel of embodiment suitable for the transfer of cylindrical containers 2 from an infeed conveyor 3, say, a conventional star wheel, to a take-up conveyor 4 which is located internally of a pressure vessel 5; the take-up wheel and the vessel are both of conventional type, and illustrated only in part. Vacuum conditions are maintained internally of the pressure vessel 5, which also accommodates a conventional seam-folding unit (not shown).

The star wheel 1 consists substantially in a hollow cylindrical body 6 in which a plurality of radially disposed recesses 6 are formed, each one opening out onto the cylindrical wall of the body and capable of accommodating a single container 2 totally within its geometrical confines. The wheel is provided with a hub 8 splined to a vertical shaft 9 which turns in bearings 10 seated in a block 11 rigidly attached to the frame of the vacuum pump assembly, denoted 12. Drive is transmitted to the shaft 9 by a bevel gear pair 13 and 14, the pinion of which is keyed to a shaft 15 rotated by a conventional prime mover (not illustrated).

16 denotes a fixed circular plate which is located immediately below the hollow cylindrical body 6, attached to the bearing block 11, and exhibits two contoured channels 17 of rectangular cross section which are alternately distanced from and redirected toward the centre of the plate 16 itself.

One of the two channels 17 occupies that part of the plate which is 16 positioned inside the pressure vessel 5, whilst the remaining channel occupies the part of the plate located externally of the vessel. 18 denotes a terminal gradient (see figs 4 and 5) providing continuity between the top surface of the plate 16 and the bottom of the contoured channel 17. Accordingly, no passage of air is possible between the two channels, which occupy diametrically opposed positions on the plate either side of the pressure vessel wall, and no loss of negative pressure occurs via the star wheel.

The circular plate 16 and its two contoured channels 17 constitute cam control means, inasmuch as the channels accommodate a plurality of

followers 19, the number of which matches the number of recesses 7 provided in the star wheel.

The follower 19 illustrated in figs 2 and 3 appears as a roller, though a ball type of embodiment would be equally suitable; at all events, the follower is freely rotatable about a pivot 20 which in its turn is axially slidable within a bush 21 capped at the top end by a centreless plug 22.

The follower pivot 20 is provided with a shoulder 23 against which to seat a spring 24 which ensheaths the part of the pivot between the shoulder 23 and the plug 22, thereby keeping the follower 19 urged into the channel 17.

25 denotes a shoe 25 integral with the bottom end of each bush 21 and exhibiting two parallel grooves 26, one either side, in which a pair of plates 27 may locate; the plates 27 in question are bolted in position at either side of a radial slot 29 cut into a disc 28 which constitutes the base of the star wheel's hollow cylindrical body 6.

As fig 1 indicates, the recesses 7 and the radial slots 29 are identical in number, and each slot affords access to a relative pivot 20, which must necessarily pass through the disc 28 in order to enable engagement of the relative follower 19 in the channel 17 beneath.

33 denotes a gasket located between the disc 28 and the hollow body 6, which ensures an airtight seal. The top side of the hollow body 6 is closed off in similar fashion by a relative disc 30, a gasket 31 being located between the two.

Also attached to each of the bushes 21, one has a wedge shaped block 32 designed to make contact with the container 2 and thrust it from the recess 7 in the manner described below.

Thus, the bush 21 and the contact block 32 together constitute ejection means by which single containers 2 are pushed clear of the respective recesses 7 both on entry into the pressure vessel, and on exit from the vessel following the seam-folding operation.

The two channels 17 are contoured and positioned in such a way (see fig 1) that during transfer of the containers from the infeed conveyor 3 into the star wheel recesses 7, the ejection means (i.e. bushes 21 and contact blocks 32) occupying the infeed sector of the wheel will be concealed within the hollow body 6, completely clear of the recesses 7.

The star wheel rotates while the circular plate 16 remains stationary, and accordingly, the bushes 21 are obliged to shift radially along the slots 29 as the cam followers 19 are gradually distanced from the centre of the plate, following the trajectory imposed on them by the channels 17.

The single bushes 21 and their contact blocks 32 will be traversed progressively along the slots 29 as the wheel turns, such that the containers 2 are ejected one by one from the recesses 7 and directed into the recesses of the take-up wheel 4, in smooth and regular succession.

This accomplished, the ejection means return to the concealed position, internally of the hollow body, in order to vacate the recesses and allow take-up of the sealed containers on their exit route from the pressure vessel.

It will be remembered that the pivots 20 are mounted slidably in their relative bushes 21; thus, the cam followers 19 can abandon the channel 17 located on one side of the pressure vessel wall, and drop into the channel 17 located on the other, by riding up and down the relative terminal gradients 18.

Embodying the plate 16 with a blank area separating the two sets of gradients, one ensures that no air is allowed into the pressure vessel by way of the channels 17.

Claims

1) Star conveyor wheel for the transfer of cylindrical containers into and out of a pressure vessel housing equipment by which the containers are vacuum sealed, exhibiting a hollow cylindrical body (6) with a plurality of radially disposed recesses (7) that open out onto the cylindrical wall of the body and serve to accommodate the single containers (2), characterized in that it comprises;
- a plurality of ejection means, each of which is slidable through the radial direction across a respective recess between a position of total concealment within the hollow body of the wheel, whereby the recess is left completely vacant, and an extended position located at the farthest outer extremity of the recess; and
- cam control means, by which the ejection means are operated both during entry and during exit of the container into and from the pressure vessel.

2) Star conveyor wheel as in claim 1, wherein each of the ejection means comprises a bush (21) which is slidable along a radial slot (29) located in the bottom face of the hollow body and coinciding with the recess, and accommodates the axially slidable pivot (20) of a spring-loaded cam follower (19) urged into contact with the cam control means.

3) Star conveyor wheel as in claim 1, wherein the single container (2) is impinged upon by a contact block (32) attached to the bush (21) of the ejection means.

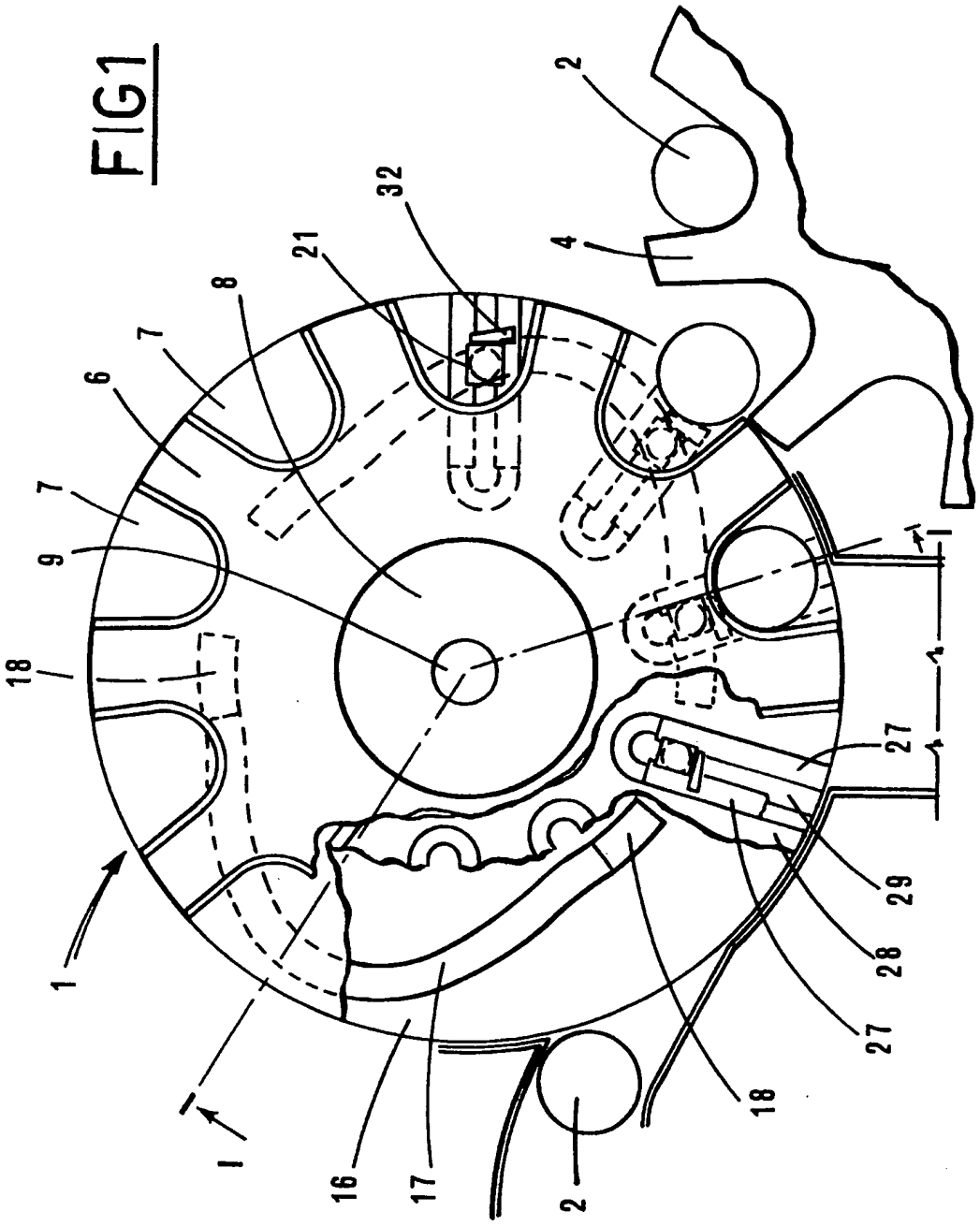
4) Star conveyor wheel as in claim 1, wherein the cam control means comprise a fixed circular plate (16) made fast to the frame of the container-sealing equipment and exhibiting two contoured channels (17) of rectangular cross section which are alternately distanced from and redirected toward the centre of the plate and occupy diametrically opposed positions thereon, one located inside the pressure vessel and the other outside, and wherein the two contoured channels (17) are engaged by the spring-loaded cam followers of the ejection means.

5) Star conveyor wheel as in claim 4, wherein each of the contoured channels (17) exhibits two terminal gradients (18) providing continuity between the top surface of the plate (16) and

the bottom of the channel.

6) Star conveyor wheel as in claim 4, wherein the two channels (17) of the cam control means are embodied separately, and permit of no intercommunication.

FIG1



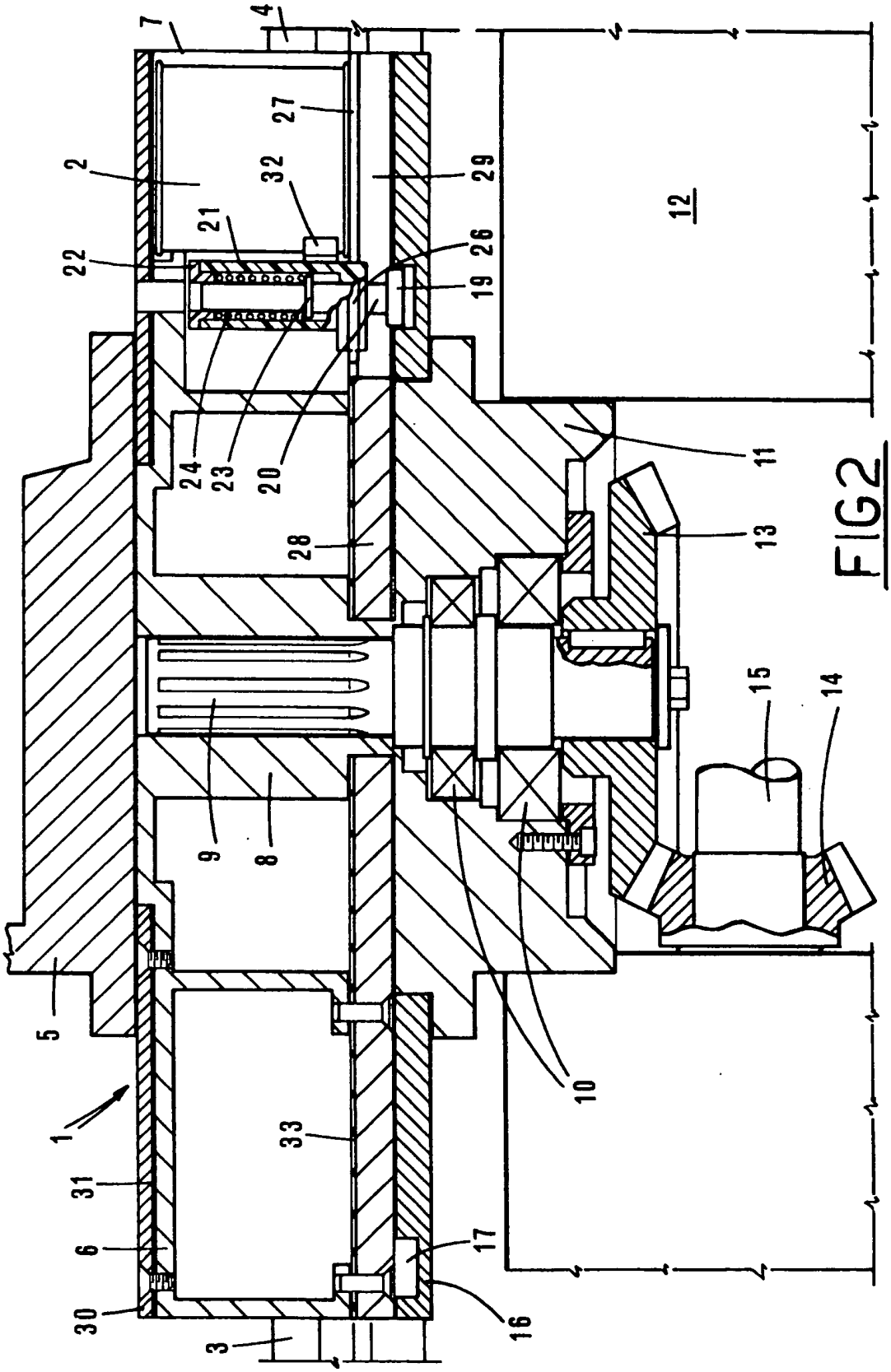

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FIG2

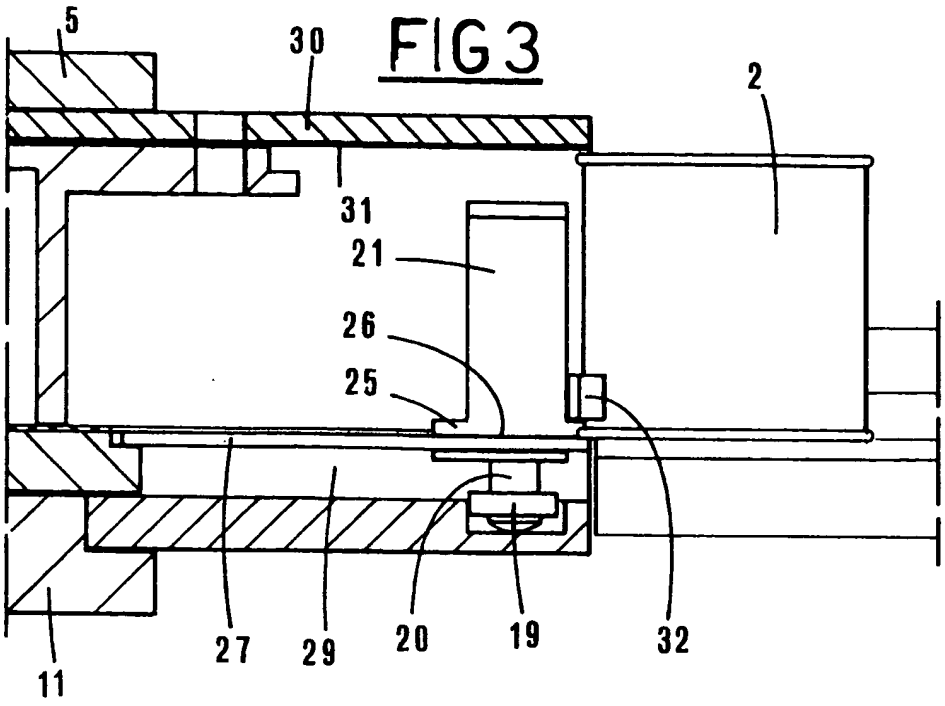

FIG3

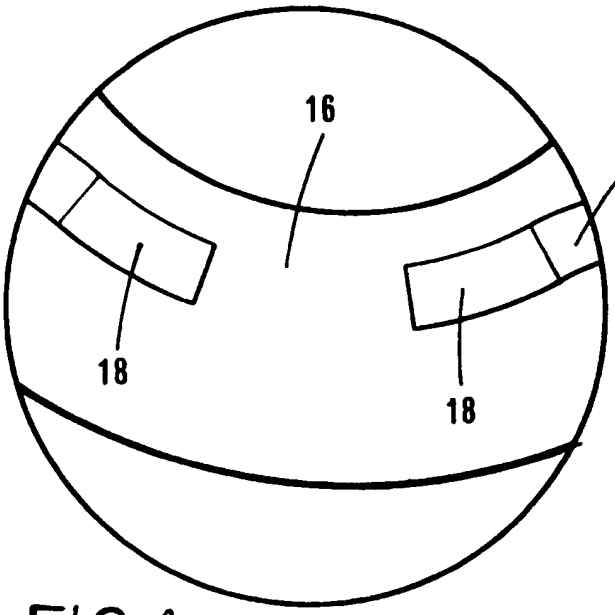

FIG4

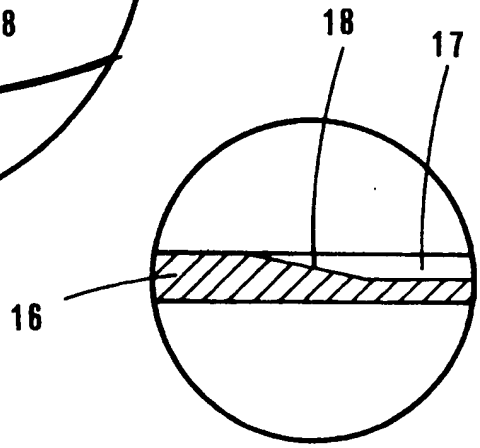

FIG5

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EUROPEAN SEARCH REPORT

Application number

EP 86 83 0371

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
Y	US-A-2 760 702 (PECHY) * Column 2, line 11 - column 3, line 30; figures 1,2 *	1,3	B 65 G 47/84 B 65 B 31/02
Y	FR-A- 932 010 (DENNIE) * Page 3, lines 36-81; figures 1-3 *	1,3	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 65 B
B 65 G
B 67 B
A 23 L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	31-03-1987	CLAEYS H.C.M.

CATEGORY OF CITED DOCUMENTS

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